

## Role of Essential Oils in the Cosmetic Industry

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### SUMMARY

Essential oils (EO's) are not limited to being used as fragrances only. These potent essences can be used in cosmetics, supplying the body with precious nutrients. It has a vast effect when applied to the human body through various cosmetic products. Every component of the plant has different characteristics with various therapeutic and nontherapeutic effects, which can be used in cosmeceutical formulation. Out of which volatile oil is the secondary metabolite obtained from plants which is used not only for fragrance but also for abundant therapeutic effect. The addition of essential oil in cosmetics enhances the shelf life of the product along with various effects. Nowadays, the essential oil industry has been growing more spectacularly. A variety of essential oil production is done by prominent industries that are also boosted to industrialization. Their use is confined to the selection and proper steps followed to admix with the cosmetic product.

### INTRODUCTION

A concentrated hydrophobic liquid containing volatile chemical compounds from plants is known as Essential oil other names are preferred as volatile oils, ethereal oils, or simply as the oil of the plant from which they were extracted, such as oil of clove. The often-used method is distillation by using steam. Further processes include expression, solvent extraction, absolute oil extraction, resin tapping, wax embedding and cold pressing. They are used in perfumes, cosmetics, soaps and other products, for flavouring food and drink, and for adding scents to incense and household cleaning products. A mixture of chemical compounds derived from either natural or synthetic sources are constituted as "Cosmetics". Cosmetic products have been generally defined as "articles intended to be applied to the human body by being rubbed, poured, sprinkled, or sprayed for cleansing, promoting attractiveness, beautifying, or altering the appearance". Essential oil/volatile oil is aromatic substances present in the specialized cells or glands of certain plants used by them to protect themselves from predators and pests, also to attract pollinators. In other words, essential oils are part of the plant immune system. But for humans, it has other uses too which they are using it in different ways for their benefit. EO's are complex mixtures (5000–7000 chemical constituents) in which mono- and sesquiterpene constituents reign, but also contain aromatic compounds, often phenylpropane derivatives and rarely meet diterpenes. Terpenic compounds are obtained from vegetable origin that enter into the natural composition of molecular mixtures that give volatile (essential, etheric) oils. Terpenoids are obtained from the mevalonate and mevalonate-independent (deoxy xylulose phosphate) pathway, whereas phenylpropanoids originate through the shikimate pathway. Obtaining aromatic waters and EO's requires raw materials and plant products of great quality. EO's are widespread in the most varied plant organs but more commonly found in flowers and leaves.

### Why to Use Essential Oil in Cosmetics

The essential oils are generally known for their fragrance, besides this they have much more therapeutic properties, which is a boon for the cosmetic industry when they are incorporated in their cosmetic preparation. The mechanisms of action of EOs are dependent on their chemical composition and the location of one or more functional groups present in the compound. They are as follows:

**I. Antimicrobial effect:** The solubility in water of essential oil constituents is directly related to their ability to penetrate the cell walls of a bacteria or fungus. The antimicrobial activity of EO's is due to their solubility in the phospholipid bilayer of cell membranes. Terpenoids which are characterized by their ability have been found to interfere with the enzymatic reactions of energy metabolism. The invitro activity of oils carried out by an impedimetric method was also compared with their activity in cosmetic preparations.

**Lavender oil:** It is extracted from *Lavandula stoechas* L which contains camphor, terpinen-4-ol, linalool, linalyl acetate, beta-ocimene and 1, 8-cineole. It shows good anti-microbial activities against most of the bacteria, filamentous fungi and yeasts causing itching and redness. The minimum inhibitory concentrations were found to be ranging from 0.16 to 11.90 mg/ml. It also soothes eczema, and skin lightening, treats psoriasis, unclogs pores and has various hair care skin care property like killing head lice and scalp inflammation, preventing dryness promote new cell growth. This oil has been used in lotion, face creams, hair oil, body wash etc.

**Lemongrass EO (LGEO):** Their extraction is done by steam distillation from the dried or fresh leaves of the plant *Cymbopogon citratus* belonging to the family of Poaceae. It mainly contains Citral  $\alpha$ , Citral  $\beta$ , Nerol Geraniol (shows antimicrobial properties) Citronellal, Terpinolene, Geranyl acetate, Myrcene and Terpinol. Additionally, this extraction of EO along with hydrosols or aromatic waters, which are used against inflammatory diseases and microbial infectious also has natural astringent properties. These can help fight pimples and heal acne by acting as an antimicrobial while also removing excess dead skin cells like blackheads and whiteheads. This is used in various face washes, scrubs face masks etc.

**II Anti-inflammatory effect:** Skin inflammation is generally due to immune response, allergic reaction and infection. This causes redness, rash, blistering, skin irritation, eczema, dermatitis, boils etc. They inhibit the release of inflammatory mediators such as prostaglandin mostly PGE2 causes pain, leukotriene involves muscle contraction, histamine shows allergic reactions etc. For example:

**Rosemary oil** is obtained from Rosemary (*Rosmarinus officinalis* Linn.) belonging to the family of Lamiaceae is noted for its anti-inflammatory, stimulating, and analgesic properties. Its main ingredients, such as esters may help keep excess sebum at bay. Researchers noted that it can help with greasy hair, and dandruff, and may even stimulate hair growth. It is an additive in skin care products meant to hydrate and balance dry or oily skin, and eczema, and reduce stretch marks and acne.

**German chamomile oil:** One of the most used EO in cosmetics. The blue chamomile essential oil is steam distilled from the flowers and flower heads of *Matricaria chamomilla* L. (Syn. *Chamomilla recutita*, *Matricaria recutita*). It contains a high percentage of sesquiterpene with a low number of monoterpenes. Important components are  $\beta$ -farnesene, farnesol,  $\alpha$ -bisabolol oxides A and B which are responsible for the anti-inflammatory, spasmolytic and antiseptic properties of the oil. The oil is also used externally in skin creams, skin oils and as bath additives as it is known to be beneficial in the treatment of skin inflammation. It is also found in mouthwashes, toothpaste, decorative cosmetics shampoos etc.

**III. Anti-aging:** When a person begins to age, the collagen component and elastin fibres present in the skin's deeper layer of the dermis start to break down, which results in the skin losing some of its elasticity. Ultraviolet [UV] radiation, which speeds up the natural ageing process, is the primary cause of early wrinkling. The intrinsic and extrinsic factors are responsible for the ageing of skin which implies wrinkles, pigmentation, patchy, skin thinning etc. Intrinsic factors caused due to genetic mutation during metabolic processes by producing free radicals, whereas extrinsic factors involve sun exposure, air pollution, smoking, alcohol consumption and poor nutrition. For example:

**Sandalwood oil:** The volatile oil extracted by steam distillation from *Santalum album* L derived from the roots and heartwood which is colourless to yellowish, the chief constituents of the oil is santalol (90% or more) a mixture of two primary sesquiterpene alcohols i.e.,  $\alpha$ -santalol dominant and  $\beta$ -santalol. Various studies have been carried out which demonstrate the presence of nitrous oxide scavenging activity and DPPH antioxidant activity. Anthocyanic pigment cyanidin-3-glucoside is found in *S. album* and majorly show antioxidant and its nutritional importance. It also explains astringent properties for promoting the skin cycle showing that dead skin cells will be removed instead of building up. According to various researches, along with skin enhancement it also helps prolong hair growth. Thus, used in the production of various face creams, face masks, and other body lotions that may help to reduce blemishes on the skin. In hair products, this volatile oil is added in hair oil, serums, and conditioners. They show very promising effects to treat various dermatological problems like acne, psoriasis, eczema, common warts.

**Lemon oil:** Lemon volatile oil belongs to [*Citrus limon* Linn. (*C. limon*)], a family of Rutaceae that includes terpenes, D-limonene, L-limonene [both mixture 90 %], 10 % of oxygenated bodies mainly the aldehyde citral and traces of phellandrene, pinene, sesquiterpene are present. Their mechanism involves the inhibitory activity of tyrosinase (melanin production) and the inhibition of L-dihydroxyphenylalanine (L-DOPA) oxidation for its depigmenting effect. The antioxidant activity of the flavonoids from *C. limon* dominantly contains vitamin C which prevents the formation of free radicals and protects DNA from mutations, specialized in dermo-cosmetics. Its constituents have antiseptic, astringent, antimicrobial, rejuvenating dull skin and detoxifying properties. Apart from this, anti-inflammatory, antiviral, anti-bacterial, anti-obesity, anti-fungal, anti-allergic, and flavouring properties are also taken into its various effect. For all these reasons, it is used in formulations of shampoos, toothpaste, topical ointments, face mask, face wash, face scrub, body wash, bath soap etc.

**IV. Aromatherapy:** EO's oils are potent and concentrated they show their action on pressure points and rejuvenate. Cosmetics aromatherapy uses these essential oils for skin, body, face and hair cosmetic products. They are administered through different methods with small quantities like inhalation, massage or simple applications on the skin surface and hardly given internally, to relieve the stress, and rejuvenate and regenerate the individual for the next day's work.

When the EO's are directly utilized as a cosmetic, their mechanism of action involves the integration of essential oils through inhalation into a biological signal of the receptor cells in the nasal mucosa. These signals are transmitted from the nasal mucosa through the olfactory nerve [CN1] to the limbic and hypothalamus parts of the brain via the olfactory bulb located in the forebrain. These signals cause the brain to release neurotransmitters like serotonin, dopamine noradrenalin, etc. These monoamines release help to relieve stress, anxiety during labour pain, and depression, causing mood elevating and refreshing. When it is loaded in cosmetic products offers various effects like cleansing, moisturizing, drying and toning. For example:

**Geranium EO:** Geranium (*Pelargonium graveolens* L' Herit) belongs to the family of Geraniaceae and contains eugenol, geranic, citronellol, geraniol, linalol (linalool), citronellyl formate, citral, myrtenol, terpineol, methone and sabinene. Along with its use in aromatherapy, it is the best natural perfume, mostly used in soaps and detergents because of unique feature, doesn't affect with alkalinity of soaps. It is used for rash, dermatitis, eczema, aging skin, some fungal infections, anti-bacterial anxiety, sedative and nervine tonic.

**Clary sage** (*Salvia sclarea* Linn.) belongs to the family of Lamiaceae which contains chemical constituents mainly linalool, linalyl acetate, alpha-terpineol, germacrene D and geranyl. Purple-tinted large hairy green leaves are the key source of essential oil in clary sage used frequently. It helps in controlling sebum production, hence can be used for both dry and oily skin, along with acne, and wrinkles and for controlling cellulite. It has a balancing property that stabilizes the production of natural oil in the body whereas it is rich in antioxidant content tones, tightens, and strengthens the skin and muscles while fortifying hair to reduce hair loss.

**V. Anti-hair fall:** Hair loss is a distressing condition as a thinning of the scalp that is associated with a multitude of natural, medical or nutritional conditions. The key mechanism is the stimulation of epidermal stem cells in the hair follicle bulge and shifting the follicles into another phase which promotes hair growth as well as prevents hair loss. By using essential oil, the scalp thickness is increased along with several hair follicles. It promotes the rapid growth stage of hair in the body. Sometimes they show effect by dilating the vessels beneath the skin which improves blood circulation.

**Peppermint oil [PEO]:** The leaves of *Mentha piperita* are used to extract peppermint oil belonging to the family Lamiaceae. Its oil constituents include carvacrol, menthol, carvone, methyl acetate, limonene and menthone. A systemic study shows that a peppermint oil solution promotes hair growth. A study in Microvascular Research found that a 4% menthol solution caused blood vessels to widen, which increases blood flow, this indirectly governs the prevention of hair loss. It acts as a moisturizer to keep the scalp hydrated, heal itchy scalp, and tame fizzy hair. PEO is used in shampoos, conditioners, hair oil, hair serum, cleansers, bath products, makeup and lotions.

**Cedarwood oil:** Cedarwood essential oil is obtained from the wood of the cedar tree (*Cedrus atlantica*). They mainly contain cedrol and  $\beta$ -cedrene compounds found in cedar wood oil. It possesses antiseptic properties that promote a clean healthy scalp. They are greatly used in eczema as there is evidence that relieves such irritated skin conditions. Oil promotes hair growth even in patients with various forms of alopecia. It boosts microcirculation in the scalp as well as the hair. Hence, it is the best essential oil for scalp problems like scalp itching, scalp infections dandruff, hair fall and other hair problems.

## CONCLUSION

There are various essential oils that human pursue in their daily life but unknown of their distinct qualities. Thus, the mystery of its diversity is somehow coming across towards the world. These features define the new approach to redesigning the cosmetic formulation. As there is the use of essential oil in various sectors, their demand in the global market is increasing day by day. Not only for its fragrance but its other abilities are also now taken into consideration in the cosmetic industry. The market size of essential oil is expanding daily, same as that of its various uses.

## REFERENCES

- Ali, B, Al-Wabel, N, A, Shams, S, Ahamad, A, Khan, S, A and Anwar F. 2015. Essential oils used in aromatherapy: A systemic review. *Asian Pacific Journal of Tropical Biomedicine*. 5(8):601-11.
- Benabdelkader T, Zitouni A, Guitton Y, Jullien F, Maitre D, Casabianca H, Legendre L and Kameli A. 2011. Essential oils from wild populations of Algerian *Lavandula stoechas* L.: composition, chemical variability, and in vitro biological properties. *Chemistry & biodiversity*. 8(5):937-53.
- De Groot, A, C and Schmidt, E. 2016. Essential oils, part III: chemical composition. *Dermatitis*. 27(4):161-9.
- Vaishnavi N Padole, Shubham Sarade, Shubhangi Rathod, Sachin More and Sachin Mendhi. 2022. Multivalent Role of Essential Oil in Cosmetics: A Review. *Int. J. Pharm. Sci. Rev. Res.* 73(2): 97-105.
- Vegh A, Bencsik T, Molnar P, Boszormenyi A, Lemberkovics E, Kovacs K, Kocsis B and Horvath G. 2012. Composition and antipseudomonal effect of essential oils isolated from different lavender species. *Natural product communications*. 7(10): 1934578X1200701039.